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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/091,772 | 03/06/2002 | Xin Jin | 555255012315 | 6853 |

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David B. Cochran, Esq.
Jones, Day, Reavis & Pogue
North Point, 901 Lakeside Ave.
Cleveland, OH 44114

EXAMINER

GHULAMALI, QUTBUDDIN

ART UNIT PAPER NUMBER

2637

DATE MAILED: 01/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/091,772 | JIN ET AL. | |
| | Examiner | Art Unit | |
| | Qutub Ghulamali | 2637 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Acknowledgment

1. This Office Action is responsive to the Amendment filed on 10/31/2005.
2. As per Applicant's amended of claim 13, the rejection under 35 U.S.C 112 is hereby withdrawn. The amendment is considered acceptable.

Response to Arguments

3. Applicant's remarks filed 10/31/2005, with reference to rejection of claims 1-13 under 35 U.S.C 102(e) and 14-34 under 35 U.S.C 103(a), have been fully considered but they are not persuasive. The rejection of these claims are therefore, still maintained. The claim rejections and response to applicant's remarks/argument follows.

Response to Remarks/Arguments

4. The applicant's Remarks/Arguments filed 10/31/2005, pages 10-12, regarding claims 1-34, have been fully considered but are not persuasive.

Applicant's remarks - The applicant's asserts, pages 10-12, that Dabak (reference 6,775,260) is unrelated to the invention set forth in the claims of the instant application and is not directed to frequency error estimation or calculation..

The examiner presents the following response – With reference to claim 1, and in particular to remarks regarding frequency error estimation, Dabak reference discloses a method of space-time

Art Unit: 2637

transmit diversity (STTD) for frequency division duplex WCDMA system very similar or equivalent to a method of obtaining frequency error estimates (interference) by calculating the sum of functions (each symbol of each user and all other paths (time intervals) in a preceding symbols, present time symbols and for next time symbols (partial symbol estimates) as a cross-correlation matrix are multiplied by the cross correlation matrix to generate the inter-symbol interference (error estimates) (col. 1, lines 32-35; col. 5, lines 15-30; col. 6, lines 17-65; col. 7, lines 45-65). The feedback circuit loop is not a necessary condition as claimed for Dabak's phase correction circuit to operate and produce error estimates because no interpretation can be derived from the method as claimed. While applicant may be his or her own lexicographer, a term in a claim may not be given a meaning repugnant to the usual meaning of that term, (In re Hill, 161 F. 2d 367, 73 USPQ 482 1947). The term "extracting" in claim 1 is used by the claim to mean obtain, or to draw from the correlation function an error estimate.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-13 rejected under 35 U.S.C. 102(e) as being anticipated by Dabak et al (US Patent 6,775,260).

Regarding claim 1, Dabak discloses a method of obtaining a frequency error estimate of the difference between a reference frequency and the frequency of a space time transmit diversity signal (fig. 1, elements 102, 100, 104, 106, 108), from first and second received sequences of symbols, transmitted respectively by first and second antennae (ANT 1, ANT 2), where each sequence has two sets of first and second intervals, such that the contents of the second interval of the second received sequence are the additive inverse of the contents of the first interval of the second received sequence comprising:

receiving the first and second sequences of symbols (figs. 1, 5A) (col. 3, lines 52-67; col. 4, lines 5-10);

calculating two sets of first and second partial sums as the sum of the contents of the first and second intervals, respectively, for each set (col. 5, lines 15-20);

calculating total sum functions for the first and second sets by summing the first and second partial sums for each set (col. 5, lines 20-40);

calculating a correlation function based on the total sum functions for the first and second sets (col. 5, lines 62-67; col. 6, lines 1-9, 46-54); and

extracting the frequency error estimate from the correlation function (col. 7, lines 45-56; col. 8, lines 16-22).

Regarding claim 2, Dabak discloses the correlation function is calculated as a time average of the product of the first total sum function and the conjugate of the second total sum function (col. 6, lines 10-19, 41-67).

Regarding claim 3, Dabak discloses the received symbols are represented by complex numbers (col. 6, lines 41-46).

Regarding claim 4, Dabak discloses extracting includes isolating the imaginary part of the correlation function as the frequency error estimate (col. 7, lines 45-56).

Regarding claim 5, Dabak (602) discloses the first and second interval in each set is adjacent (fig. 1, elements T, 2T).

Regarding claim 6, Dabak discloses the first and second sets of intervals are interleaved (rearranged) with each other (col. 5, lines 16-26).

Regarding claims 7-9, Dabak discloses contents of the first and second intervals in each set form a complete symbol (col. 5, lines 17-32).

Regarding claim 10, Dabak discloses adding the correlation to a correlation of a second set of total sum functions calculated by summing the first partial sum with the additive inverse of the second partial sum (col. 7, lines 45-67).

Regarding claim 11, Dabak discloses multiplying the frequency error estimate by the average of a signal-to-noise-ratio of the received sequences (fig. 2; col. 4, lines 23-52).

Regarding claim 12, Dabak discloses altering the reference frequency based on the frequency error estimate to minimize the difference between the reference frequency and the frequency of the space time transmit diversity signal (col. 8, lines 15-25).

Regarding claim 13, Dabak discloses carrying out all of the steps parallel to provide a multitude of diverse correlation functions (see claim 1 above); and combining the multitude of diverse correlation functions to provide the correlation function before extracting the frequency error from the correlation function (see claim 1 above).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 14-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dabak et al (US Patent 6,775,260).

Regarding claim 14-31, the steps claimed as apparatus is nothing more than restating the function of the specific components of the apparatus as claimed above and therefore, it would have been obvious, considering the aforementioned rejection for the method claims in 1.

9. Claims 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dabak et al (US Patent 6,775,260) in view of Krasner (US Pub. 2002/0084933).

With reference to claim 32, Dabak discloses all of the claimed limitations. Dabak however, fails to disclose a loop filter and a controlled oscillator operatively coupled to the loop filter. Krasner in a similar field of endeavor discloses (fig. 9) a loop filter, operatively attached to the frequency discriminator (550) to receive the frequency error, for generating an oscillator control signal based on the frequency error to minimize the difference between the reference frequency (542) and the frequency of the space time transmit diversity signal (col. 5, section 0072); and a controlled oscillator, operatively attached to the loop filter to receive the oscillator control signal, for generating the reference frequency based on the oscillator control signal (col. 5,

Art Unit: 2637

section 0072). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a closed loop tracking to correct frequency error as taught by Krasner in the circuit of Dabak because it can mitigate the error between the received signal and the reference and the loop then provides a correction signal to compensate for the error.

Regarding claims 33 and 34, the use of numerically controlled or a voltage controlled oscillator, is designed based and their availability and use are well known in the art and therefore, its use is obvious to a person of ordinary skill in the art.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patents:

Nafie et al (US Pub 2005/0058216) discloses a block level space time transmit diversity wireless communications system.

Dabak et al (USP 6728302) shows a STTD encoding of signals from a multiple antennas.

Kuchi et al (USP 6748024) discloses a method and apparatus for phase hopping and space time coding of signals.

Partyka et al (USP 5241562) discloses a spread spectrum communication system for reducing the frequency errors.

Brown et al (USP 6650694) shows a correlator coprocessor for CDMA RAKE receiver operations.


Contact Information

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qutub Ghulamali whose telephone number is (571) 272-3014. The examiner can normally be reached on Monday-Friday from 8:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571) 272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

QG.
January 18, 2006.


JEAN B. CORRIELUS
PRIMARY EXAMINER
1-18-06